AMENDMENTS TO THE CLAIMS

I. Kindly cancel claim 15 and 17, 33, 35-37.

II. Kindly amend the claims 1-14, 16, 18-32 and 34 as follows.

III. Kindly also add new claims 38-63.

Claim 1 (currently amended): A reaction matrix comprising a waveguide including a core region and a dielectric cladding region capable of guiding and channeling light [~~and having on the surface of said waveguide a~~], said dielectric cladding [~~layer~~] region [~~having~~] containing at least one [~~area of depletion~~] nanowell wherein a substance placed within said [~~depletion area can be~~] nanowell is illuminated by [~~the~~] an evanescent wave of light channeled in said waveguide.

Claim 2 (currently amended): A system for detecting the presence of [~~a~~] target [~~substance~~] substances in test samples comprising:

a polymer film waveguide core layer for propagating [~~capable of optically guiding~~] light [~~propagated therethrough, said light propagation comprising an evanescent wave, and~~];

[~~a cladding layer of material comprising at least one depletion area wherein said cladding layer is in optical communication with said polymer waveguide and said depletion area is in optical communication with said evanescent wave.~~]

a polymer waveguide cladding layer in contact with said core layer containing a plurality of nanowells for holding said test samples;

a light source optically coupled to said core layer, said light source creating an evanescent wave in said cladding layer, whereby said evanescent wave causes

detectable changes in test samples that contain target substances.

Claim 3 (currently amended): The system of claim 2 further comprising [~~for~~] detecting one member of a pair of binding partners in [~~a test sample~~] at least one of said test samples [~~wherein~~] when said [~~test sample~~] at least one sample is brought into fluid communication with [~~said depletion area which further comprises~~] a particular nanowell, said particular nanowell containing the other member of said pair of binding partners, said binding partners binding in said particular nanowell to form a single bound unit.

Claim 4 (currently amended): The system of claim 3 wherein the binding of said binding partners [~~can be excited by said evanescent wave which can be detected and related to the presence of said binding partner in the test sample~~] is detected by a change caused in said bound unit when excited by said evansecent wave.

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Claim 5 (curently amended): The system of claim 3 [~~4 where~~] wherein said one member of said binding partners contains a

fluorescent label [~~is associated with said binding partners~~] such that when a pair of said binding partners have bound, said fluorescent label is excited by the evanescent wave resulting in detectable fluorescence.

Claim 6 (currently amended): The system of claim 3 wherein said [~~propagated light~~] evanescent wave is characterized by a detectable phase and the presence of said bound pair of said binding partners in said [~~depletion area~~] nanowell causes a detectable change in the phase of said [~~propagated light~~] evanescent wave.

Claim 7 (currently amended): A polymer nanotitre tray comprising: [~~a polymer comprising at least one waveguide and a cladding layer comprising at least one well for containing a fluid, said well in optical communication with said waveguide.~~]

a plurality of optical waveguides having core layers and cladding layers;

a plurality of nanowells each situated internally in at least one of said cladding layers;

at least one light source optically coupled to said waveguides, said light source exciting evanescent waves in said cladding layers, at least one of said evanescent waves optically coupling into at least one of said nanowells, whereby a detectable change in a target substance in said nanowell is detected to indicate the presence of said target substance.

Claim 8 (currently amended): The polymer nanotitre tray of claim 7 wherein [~~the tray comprises a plurality of wells, said wells having~~] each of said nanowells has a volume less than about 50 nanoliters[~~, and each of said wells is in optical communication with at least one waveguide~~].

Claim 9 (currently amended): The polymer nanotitre tray of claim [~~8~~] 7 wherein each [~~well~~] nanowell is in independent optical communication with a [~~respective~~] separate optical waveguide.

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Claim 10 (currently amended): The polymer nanotitre tray of claim [~~8~~] 7 wherein said tray is a flexible film.

Claim 11 (currently amended): The polymer nanotitre tray of claim [~~8~~] 7 further comprising at [~~lease~~] least one capillary channel in fluid communication with at least one [well] nanowell.

Claim 12 (currently amended): The system of claim 2 further comprising a detector for detecting [~~a change~~] said changes resulting from [the] optical communication of said evanescent wave with said [depletion area] nanowells when at least one of said target [substance] substances is present.

Claim 13 (currently amended): The system of claim [~~3~~] 12 wherein said detector is a fluorescent detector [~~for detecting fluorescence when said target substance is present, said fluorescence being selected from the fluorescence which has been optically coupled to said waveguide and fluorescence which is generally orthogonal to the polymer waveguide~~].

Claim 14 (currently amended): The system of claim [~~3~~] 2 further comprising at least one capillary channel in fluid communication with said [~~depletion area~~] nanowells for

conveying at least one of said test samples [~~said test sample~~] to said [~~depletion area~~] at least one of said nanowells.

Claim 15 (cancelled).

Claim 16 (currently amended): The system of claim [~~15~~] 14 wherein each of said [~~depletion areas~~] nanowells may be individually illuminated [~~with~~] by said evanescent wave.

Claim 17 (cancelled).

Claim 18 (currently amended): The system of claim [~~17~~] 13 wherein said detector is situated on [~~the~~] a first surface of the waveguide opposing [~~the~~] a second surface which is optically coupled to at least one nanowell [~~the depletion area whereby said detector detects fluorescence emitted from said depletion area and which travels through said waveguide at an angle greater than that which would result in coupling of said fluorescence with said waveguide~~].

Claim 19 (currently amended): The system of claim [~~6~~] 4 wherein said change is selected from fluorescent emission and phase change.

Claim 20 (currently amended): The system of claim [~~6~~] 4 wherein said change is fluorescence.

Claim 21 (currently amended): The nanotitre tray of claim [~~8~~] 7 wherein each [~~well~~] nanowell is in optical communication with a common waveguide.

Claim 22 (currently amended): A method for detecting the presence of [~~a~~] target [~~substance~~] substances in a [~~sample~~] samples comprising the steps of:

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providing a planer film waveguide structure including a core region and a cladding region;

providing in said cladding region a plurality of wells wherein said samples are placed;

causing light to propagate through said waveguide structure, said light producing an evanescent wave in

said cladding region, said evanescent wave optically communicating with said samples in said wells to cause a detectable change when said target substance is present;

[~~providing a detecting system comprising a polymer waveguide capable of optically guiding light propagated therethrough, said light propagation comprising an evanescent wave, and a cladding layer of material comprising at least one depletion area wherein said cladding layer is in optical communication with said polymer waveguide and said depletion area is in optical communication with said evanescent wave;~~]

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[~~contacting said sample with said depletion area whereby said target substance, when present interacts with said evanescent wave to cause a detectable change; and~~]

detecting whether said change has occurred.

Claim 23 (original) The method of claim 22 wherein said change comprises fluorescence.

Claim 24 (currently amended): The method of claim 22 wherein said [~~depletion region comprises~~] well contains a binding partner to at least one of said target [~~substance~~] substances, and said method further comprises adding a test reagent [~~comprising~~] containing a fluorescent label which becomes associated with at least one of said target [~~substance~~] substances when bound to said binding partner.

Claim 25 (original): The method of claim 24 wherein said change comprises fluorescence.

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Claim 26 (currently amended): The system of claim 14 further comprising a microseparation column in fluid communication with said [~~depletion areas~~] nanowells, whereby [~~the~~] at least one test sample may undergo a separation process prior to entering said [~~depletion area~~] nanowells.

Claim 27 (currently amended): The system of claim 2 further comprising a protective layer intermediate [~~said cladding~~

~~layer having at least one depletion area and said polymer waveguide~~] to said cladding layer containing at least one nanowell.

Claim 28 (currently amended): The system of claim 2 further comprising microfluidics channels for conveying said target [~~substance~~] substances to said [depletion area] nanowells.

Claim 29 (currently amended): The system of claim 27 wherein said [~~depletion area~~] nanowell has a refractive index [~~and said waveguide polymer has a refractive index which is different than the refractive index of said depletion area~~] different from the refractive index of said cladding layer.

Claim 30 (currently amended): The system of claim 2 [~~further comprising a light source having a wavelength~~] wherein said light source has a wavelength capable of exciting fluorescent molecules [~~, or having a long wavelength for heating or light which is polarized~~].

Claim 31 (currently amended): The system of claim [~~27~~] 2 [~~further comprising a light source having a wavelength~~]

wherein said light source has a wavelength capable of causing heating [~~capable of exciting fluorescent molecules, or having a long wavelength for heating or light which is polarized~~].

Claim 32 (currently amended): The system of claim [~~32~~] 2 wherein said light source is polarized [~~wherein the light from the light source is in optical communication with the waveguide and enters the waveguide at an angle whereby total internal reflection can occur~~].

Claim 33 (cancelled).

Claim 34 (currently amended): The system of claim [~~33~~] 2 wherein [~~the waveguide, protective layer and~~] said cladding layer [~~comprise~~] contains materials [respectively] chosen for controlling [~~the~~] depth [~~that the evanescent wave penetrates the depletion area~~] of penetration of said evanescent wave into said cladding layer.

Claims 3~~4~~5-37 (cancelled).

Claim 38 (new): A system for detecting the presence of target substances in test samples comprising:

a polymer film waveguide structure including a core region and a cladding region, said cladding region containing a plurality of nanowells, each of said nanowells further containing bound test molecules;

a light excitation source optically coupled to said waveguide structure, said optical source causing light to propagate in said waveguide structure, said light creating an evanescent wave in said cladding region, said evanescent wave in optical communication with said bound molecules in said nanowells;

a plurality of fluorescent labels chemically attached to molecules in said test sample;

a means for causing said test samples with said chemically attached fluorescent labels to contact said bound test molecules in said nanowells, whereby said test samples containing said target substances bind to

said bound test molecules, and said test samples not containing said target substances remain unbound; means for detecting said excited fluorescent labels.

Claim 39 (new): The system of claim 38 wherein said waveguide structure is a thin film.

Claim 40 (new): The system of claim 39 wherein said thin film is can be supplied rolled up.

Claim 41 (new): The system of claim 2 wherein said waveguide structure is a thin film.

Claim 42 (new): The system of claim 38 wherein said waveguide structure is a single-mode waveguide.

Claim 43 (new): The system of claim 2 wherein said waveguide structure is a single-mode waveguide.

Claim 44 (new): The system of claim 39 wherein said thin film has width between around 8 mm to 32 mm.

Claim 45 (new): The system of claim 41 wherein said thin film has width between around 8 mm to 35 mm.

Claim 46 (new): The system of claim 44 wherein said thin film is supplied in a cassette.

Claim 47(new): The system of claim 45 wherein said thin film is supplied in a cassette.

Claim 48 (new): The system of claim 38 further comprising fluidic channels in fluid communication with said nanowells.

Claim 49 (new): The system of claim 38 wherein said light excitation source is polarized.

Claim 50 (new): The system of claim 38 further comprising said light excitation source operating at a plurality of wavelengths.

Claim 51 (new): The system of claim 48 wherein at least one of said plurality of wavelengths causes heating of said test samples in said nanowells.

Claim 52 (new): The system of claim 38 wherein said cladding layer is cellulose acetate butyrate.

Claim 53 (new): The system of claim 2 wherein said cladding layer is cellulose acetate butyrate.

Claim 54 (new): The system of claim 38 further comprising at least one additional layer attached to said cladding layer.

Claim 55 (new): The system of claim 38 wherein said nanowells have dimensions between around 1 micron to 200 microns.

Claim 56 (new): The system of claim 2 wherein said nanowells have dimensions between around 1 micron to 200 microns.

Claim 57 (new): The system of claim 38 wherein said nanowells are formed by UV depletion.

Claim 58 (new): The system of claim 2 wherein said nanowells are formed by UV depletion.

Claim 59 (new): The system of claim 38 wherein said bound molecules are DNA oligos.

Claim 60 (new): The system of claim 38 further comprising a means for detecting said fluorescence.

Claim 61 (new): The system of claim 60 wherein said means for detecting said fluorescence is a photo-multiplier tube.

Claim 62 (new): The system of claim 60 wherein said means for detecting said fluorescence is a charge coupled device.

Claim 63 (new): The system of claim 38 further comprising a means for flushing said nanowells so that said unbound test samples exit said nanowells, whereby said evanescent wave excites only said fluorescent labels on said test samples containing said target substances.